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Surfing the wave – organizational learning and wikis

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Abstract: This paper investigates driving forces and hinders for collaborative knowledge creation, and the influence of IT-support technologies. We look at the use of wikis in learning situations and the problems and possibilities for support of learning processes. The focus is on organizational learning, however not many reports are to be found on this topic. To gain some initiating insight into how to support organizational learning we look at some evidence from education. An overview from past studies and some evidence from our own use of wikis are used as a base for suggestions for the possibilities of wikis. Some important problems to be addressed before launching a corporate wiki include are discussed.

Keywords: Empirical study, educational setting, collaborative work

1. Introduction

This paper investigates driving forces and hinders for collaborative knowledge creation, and the influences of IT-support technology, the wiki. A wiki is today a household concept for working with knowledge content on websites. A wiki could be seen both as a class of computer software and as a cultural phenomena with broader implications for knowledge development in society (Moskaliuk and Kimmerle, 2009). Tapscott and Williams (2006) talk in very positive wordings about the wiki and its possibilities for supporting collaborative work. In a set of success stories from companies, such as Procter & Gamble, BMW, and Lego, the authors show how wikis can be used in companies.

The focus of this paper is on organizational use of wikis, however not many reports are to be found on this topic (Arazy et al., 2009). This even more true when it comes to the learning perspective, a literature search was made using the terms “title: wiki* and learning”, which gave just above 30 hits, and a handful of them was connected to corporations, while most of them were coming from education.

We look at the use of wikis in learning situations and the problems and possibilities for support of learning processes. We do this by looking at current research on wikis used in education, and at how experiences here can be used as guidelines for wikis in organizational learning.

The research is structured as follows: a literature review with focus on learning and wikis. Then we present some experience from the use of wikis in courses that we have given at our university. An analytic discussion about these findings and their connections to previous reports together ends in some central and important issues for successful use of wikis. As a result, these issues are brought back to learning organizations and some final point about problems and possibilities are made.

2. Frame of references

2.1 Learning and learning in organizations

Organizational learning and in later years, knowledge management, are focused on how knowledge are created and used in organizations. In general, a number of aspects are possible on learning, here we work with a rather general framework in order to catch different aspects of wikis and how it might be useful in organizational learning.
2.1.1 A frame for organizational learning processes

Learning can be understood on different levels, (including individual, group or organizational) and approach from different perspectives, (including cognition, social or as a power relationship) (Aidemark, 2003). This can be expressed as an “organizational learning level and perspective” matrix, see table 1.

Table 1: Organizational learning level and perspective matrix

<table>
<thead>
<tr>
<th>Perspective Level</th>
<th>Cognitive</th>
<th>Social</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Group</td>
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<td></td>
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<tr>
<td>Organization</td>
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</tbody>
</table>

2.1.2 Basic learning processes

There are a number of different types of learning. Huber (1991) suggests five types: congenital, experiential, vicarious, grafting, and searching. For creating new knowledge on an individual level, we can look at the well-known and practical model for learning “Lewinian experiential learning model” (Kolb, 1984). Learning is a process of gaining new knowledge by transforming of experience, Kolb says. The model presented by Kolb (1984, p. 30) contains four types of abilities that a person should master in order to learn: 1) observation and reflections, 2) concrete experience, 3) testing of concepts in new situations, and 4) formation of abstract concepts and generalizations. Kolb works very much in an empiricist philosophy traditions, where observation of nature is basis of knowledge. However, the other of the above mentions learning types are important, for example vicarious learning (learning from others). Nevertheless, in order to make knowledge personal and useful in certain contexts, the full experiential cycle is needed.

2.1.3 Learning in groups

Looking at the group level, we can take a look at action learning (AL). This is an early example of organizational learning, based on the works of John Revans (for example Revans, 1981). In (Revans, 1981, p. 627) the following key points are made:

- Intellectual development by responsible involvement in a real problem, achieving intended changes in the problem field and in by this change his own behavior.
- Learning by doing supported by a learning program or other organization of the learning.
- Learning is achieved in discussion with others.
- Reinterpretation of own existing knowledge, not on new facts provided by experts.
- Knowledge creation as a social process, learning in co-operation.
- Awareness of value system.
- Learning under threat of failure, a failure that matters.
- Commitment to the result and responsible action.

A central theme is how people find motivation to learn, (Revans, 1981, p. 488):

- Active concern of those in charge.
- Responsibility and commitment of the person.
- Chance to try out new methods.
- Methods of participation in groups.

2.1.4 Learning on an organizational level

Argyris and Schön (1996), talk about organizational learning as learning as efforts for improvements in the organization. Learning on an organizational level is still at its core, people that are learning, but on the behalf of the organization (Argyris and Schön, 1996, p. 16). The organization provides an environment where individuals learn for the improvement
of the organization. Argyris and Schón identify three productive types of learning: 1) organizational inquiry that leads to the improvement of in the performance of tasks, 2) inquiry that leads to exploration and restructuring of organizational values and criteria for organizational improvements, and 3) inquiry that leads to better organizational capabilities for learning of type one and two. Type 1 is also known as single loop learning and type 2 as double loop learning.

On this organizational level there exist some theories about how the organization in general should be set up to facilitate the learning processes need for staying competitive and ensuring long time survival. An example of one approach is Senge’s (1990) learning framework “the fifth discipline”: which can serve as an illustration of what might be involved. The framework details five “building blocks”: systems thinking, personal mastery, team learning, mental models and shared vision. This set of abilities points at the need of connecting aspects of learning from different levels, including organization, group and individual. Argyris and Schón (1996, p. 184) comment on the connection between the mental models of Senge and the idea of theory-in-use that is central for Argyris and Schón. Both of these concepts points at the importance of the implicit assumptions each individual holds and how much these govern the learning processes.

2.2 Wikis in organizations

Tapscott and Williams (1996), in exploring how companies in the early 21st century have used mass collaboration and open-source technology, such as wikis, to become successful, point upon four founding principles of the wiki concept. These are: 1) being open (flexible, expansive, engaging, etc.), 2) peering (working together in an open-source sense), 3) sharing (not in an altruistic but in a “coopetitive” sense), and 4) acting globally (inviting that needed disruptive energy of new ideas). According to Tapscott and Williams, these principles converge as individuals come together and collaborate for improvements in the workplace and beyond. When this convergence happens, a new perspective is yielded on how knowledge is generated and leveraged within such typical organizational functions as teaming, time allocation, decision-making, resource allocation, and communications. Tapscott and Williams point upon Goldcorp Inc., a gold-mining company, that managed to turn around a rather local and modest existence to a global and dominate by embracing the wiki concept. Here, Goldcorp Inc. invited the help of others in finding new locations by sharing their geological data. They also point upon success stories of Google and IBM, who has fully embraced the wiki concept in supporting how work is organized and performed. Tapscott and Williams also describe other more concrete examples of how wikis are used for organizational knowledge creation and sharing. Here, they point upon Xerox, where wikis are collaboratively used to define the company’s technology strategy, and Dresdner Kleinwort (DKW), a Europe-based investment bank, where teams adopted wikis as a way to get collaborative projects up and running quickly. Indeed, the authors present many more such examples of successful organizational applications of the wiki concept.

Moskaliuk and Kimmerle (2009) discuss two aspects of a wiki, functional aspects of this class of software and some psychosocial principles that is hoped that a wiki could support and help foster.

Some functional characteristics according to Moskaliuk and Kimmerle (2009):
- Quick and easy editing. Content can be directly be modified and added.
- Wiki-links. Pages are connected by simple web-links.
- No hierarchical structure. In essence, a flat structure of linked pages.
- Revisions. A wiki automatically keeps versions of the pages.
- Collaborative product. A wiki page displays the status quo of collaboration.
- Scalability and flexibility. Wiki software is easy to scale up.

Moskaliuk and Kimmerle (2009) suggest a number of psychosocial principles for the work with a wiki.
- Openness. All wiki content should be open to everyone. Any user, registered or anonymous, should be allowed to read and revise content.
- Self-organization. Within a wiki, no formal roles should be assigned. All users need to have the same options, rights, and responsibilities.
- Autonomy. Working on a wiki should be voluntary.
- Interest and personal relevance. The advancement and improvement of knowledge in a community is much greater if all users are personally interested in the topics and content of the wiki.

2.3 Wikis in education

In experiment with students with different background, Perez-Mateo and Guitert (2009) reports a number of factors to be considered: 1) pre-knowledge about wikis, 2) perceived usability, 3) availability of time, 4) student profile (computer science vs. psychology students), and 5) initiative taken by group member. This study points much to the user and its priorities, motivation and knowledge as key factors.

In Tetard et al. (2009) a wiki was used for a collaborative writing task and the use was evaluated. The outcome show that that particular wiki software that was used was deemed to be of low usability (creating links and creating pages was difficult). Communication was discovered to go along with high wiki usage, people who also used a discussion forum to interact with peers also contributed to the wiki. The students over all thought that the coordination during the writing process was hard. A question about getting overview of the wiki as a whole was put to the students, and the investigators got a mixed answer, half of the group thought hard to get an overall overview. Tetard et al. (2009) provides some checkpoints for a successful use of a wiki. 1) Not all wikis are alike, must make sure of high usability. 2) Peer reviews are important for quality of the outcome, including feedback, discussion and sources checking. This checkpoint points to the collaborative nature of a wiki and the process of socially constructing knowledge in interaction with peers. 3) Individual contribution, if the wiki allows to review what different persons do or not. 4) Types of wiki users: leaders and free riders. The leaders were seen as important to get the work going, at the same time the investigators notice that some people just tagged along. 5) Level of participation, the level of participation was a concern among the students. Tetard et al. (2009) finish off with a characterization of the work with the wiki as democratic and informal, noting that this have a backside, of lack of transparency, possibility to evaluate and free rider problems.

2.4 Social learning

Wenger (1998) views learning as social participation, i.e. being active participants in the practices of social communities and constructing identities in relation to these. He focuses on learning in relation to the concepts of practice, community, identity, and meaning. Practice is viewed as the shared historical and social resources, frameworks, and perspectives sustaining mutual engagement in action, thus depicting learning as doing. Community is viewed as the social configurations defining our enterprises as worth pursuing and recognizing our participation as competence, thus depicting learning as belonging. Identity is viewed as how learning changes what we are, creating personal histories of becoming members of the community, thus depicting learning as becoming. Meaning is viewed as our ability to experience our life and the world as meaningful, thus depicting learning as experience.

Central to this strand of thinking is the concept of communities of practices, which finds its basis in the work of Lave and Wenger’s (1991), and Brown, Collins, and Duguid (1989) on situated learning and cognition. According to Wenger (1998), communities of practice have three characteristics that distinguish them from other collectives: mutual engagement, joint enterprise, and shared repertoire. Mutual engagement is defined as the interactions between participants in the community necessary to perform the work, and essential for the negotiation of meaning, i.e. making sense of the practice. Joint enterprise is defined as the collective
negotiated goal, changing as the community changes and not subject to a predefined design. 

*Shared repertoire* is defined as the behaviors and means for expression and communication that have become common, because of a history of interactions within the community.

Design for learning is here, to Wenger (1998), an issue of balancing different dimensions that a learning architecture, in enabling or supporting our belonging to a social learning system, should address. He points out four dimensions that are important and affect the design of social learning systems. The first dimension is one concerning *participation vs. reification* within the practice. Participation within the practice entails allowing new members to enter either through legitimate peripheral participation (Lave & Wenger, 1991) or through multi-membership with different communities. It also entails ensuring possibilities for working together and establishing joint ventures. Reification deals with the formation of shared repertoire, common language, and community memory and so forth. Wenger (1998) places strong emphasis on the negotiating of meaning within social learning systems, where participation and reification are two cornerstones in that process. The second dimension concerns the balance between the *designed and the emergent* within the practice, allowing new structures to emerge as the practice moves forward and providing fixed structures in ensuring continuity, i.e. flexibility vs. rigidity. The third dimension concerns the *local and the global*, connecting the practice with the outer world or a larger context. It concerns how locally generated, highly situated, knowledge may find its way out of the practice and allowing it to have effect elsewhere within the organization. It also concerns how the endeavors of the practice are aligned with the rest of the organization. The fourth dimension concerns possibilities of *identification with and negotiability within* the practice. Here, design creates areas of identification where economies of meaning may be negotiated. It addresses the issues of participation and non-participation of the practice and establishes or questions the owner-ship of the negotiated meaning within the practice.

These dimensions of design for learning were later addressed by Wenger, McDermott, and Snyder (2002) and formulated as seven principles for cultivating communities of practice in order to provide practical guidelines for organizations:

- Design for evolution - enabling the community to develop in new directions as new ideas and members join in.
- Open a dialogue between inside and outside perspectives - enabling activities of the community stay in contact with reality and new energy to be brought in.
- Invite different levels of participation - enabling members (or non-members) to participate at different levels of interaction with and within the community.
- Develop both public and private community spaces - enabling areas of the community to be private (exclusive) were new things may be tried out (in safety) before going public.
- Focus on value - enabling members of the community come together for the sake of pursuing common interests and making them visible.
- Combine familiarity and excitement - enabling members to find a safe way back home from explorations into the wild.
- Create a rhythm for the community - enabling ongoing interest in the life of the community by upholding sufficient regular activities.

### 3. Case study

#### 3.1 Research setting

The aim of the case study was to explore the possibilities of the wiki concept in supporting collaboration and learning in a community setting. However, in order to conduct the study three important characteristics of a community of practice, as defined by Wenger (1998), had to be abandoned: freedom of membership, freedom of setting goals, and freedom of time.
restrictions. These ideal characteristics of a community could not be upheld, as they would have made the study difficult to perform within a reasonable timeframe.

The study was conducted at two occasions with first year under-graduate students in information systems as part of a course in organizational communication, coordination, and collaboration. At both occasions, in October 2007 and 2008, the students were given the exact same task under identical conditions. The task given to the students was to write a meta-wiki together about the content of Dan Tapscott’s and Anthony D. Williams’ “Wikinomics: How Mass Collaboration Changes Everything” (1996). To guide the student a predefined high-level structure of the wiki had been arranged based upon the chapters of the book, but students were free to expand deeper upon this structure if it suited their needs, as long as the main high-level structure was intact. Most students had encountered a wiki, in one form or another, and had some preconception of what of what to expect, but almost no one had had any previous experience in actively working collaboratively with a wiki. The time-period of the task was not open-ended, but set to exactly a week on both occasions. The main reason for this was that the task must be completed in a timely fashion and evaluated, and that it must fit within the timeframe of the course.

Each student was given three chapters to concentrate upon during the task. The students were mixed in groups so that no student ever came to share a chapter with another fellow student. This was arranged in order to prevent them from forming coalitions with each other that could possibly have negative effects on the experience of working together by other members of the group. The limit of three chapters per student was because having a student to do more, would lead to groups with more than six members making the contributions of each student impossible to trace. Fewer chapters would lead to too few students working together with the wiki to force the experience we wanted to achieve of working together in a group.

Students were told to work in a distributed manner, each with their own computer connected to the server running the wiki, at their own chosen location. At both occasions, all students were given access to the “empty” wiki with its predefined high-level structure at the same time, and at the end of the task period, that access was denied them. After the task was completed, the students were individually given an opportunity to reflect upon their work. They were given the assignment to write a reflection on how the wiki as a medium and platform supported collaboration along the design principles of Wenger, McDermott, and Snyder (2002). In addition, an evaluation seminar was held directly after the task was completed in which the experiences of the task in itself, how the wiki as a platform supported collaboration were discussed and explored. From these studies, we gathered our experiences of leading this exercise, students’ comments at the evaluation seminar, and all of the individual reflections (in total 44).

3.2 Empirical findings

From the study we have summarized our experience and findings into four emerging central, gravitational converging, themes when it comes to how the wiki as a concept supported collaborative work and learning in our community setting. These themes are not exhaustive and mutually exclusive, but in some instances, different aspects of the same observed phenomena.

- “Surfing the wave”
- “Non-wikiness”
- “The invisible hand”
- “Peerness”

- “Surfing the wave”, deals with issues of working together in a timely fashion, that of synchronizing the joint engagement to harness the collaborative power. For collaboration to bear fruit, it must be done at the peak of the energy surge, i.e. when the energy of the group is at its top and feeds itself. Some students reported that they entered into the task, finding them to be the first one at the stage, on virgin soil, and did not know what to do and left to wait for
the others to join in. Yet others finding them in similar situations tried to draw up some preliminary ideas about the content of their dedicated chapters, but not getting any response from the others also left to wait for them to join. When eventually these early birds, eager to get on to the job quickly, returned again, they tended to do so towards the end of the task period. Those that came in too late reported that they often felt that they had missed the “surf wave”, only to see the others riding together ahead of them on the crest. Their contributions were not impressive as they seldom left any traces behind in fear of disturbing that which the others had created together. They were left in the wake of the others. This also raised the question among the participating students of what happens if one fails to participate for some reason, as the wiki may not support all types of collaborative efforts.

- “Non-wikiness”, deals with the issue that working completely online within the wiki platform was not satisfying to the students. They raised the question of where is the “social” in the wiki as a media. Students reported that they definitely needed to come together and meet. This need seemed mostly to surface in the beginning of the task, in order to set down roles and draw up the working order, i.e. as several students reported, to talk things through. This was done at the initiative of the students themselves, which shows that the need to socialize, beyond what ones virtual presence could achieve, was a strong driving force. Students reported a need to build up a level of trust with each other and organize the joint work in a manner that could not be achieved in an online fashion. They needed to tackle the problem of anonymity versus accountability of one’s actions. Some students reported that they regularly went “off-wiki” in order to synchronize their efforts as it was impossible to do so, confined solely to the format of the wiki as a collaborative platform.

- “The invisible hand”, deals with the issues of who drives the stake into the ground, who enforces or upholds the meaning and agenda within the collaborative group. It raises the question of how the participants in the collaborative effort are coerced in the same direction, and how and whose goals are defined. Wenger (1998) do consider the issue of power, defined as belonging to the one or those who form the nexus of giving meaning to the activities of the community at the current time. In our study we could not leave it up to the students establish this by themselves. As they were given a set task, we had to make sure they were steered in the right direction to complete the task in a timely and as orderly fashion as possible. Thus we came to play the “hand of god” in order to gently coerce them and guarantee some form of acceptable outcome. As it turned out, students reported that the high-level structure and the given task was not confining at all. The students represented a group of rather independent individuals who had not freely elected to be part of this “community setting”, and had we not enforced some order, a lot of time and energy would have been wasted in order to organize themselves without there ever being any guaranteed outcome at all. Students reflected upon the fact that had they known each other longer, i.e. had a common history of doing similar things together, and had know what an acceptable outcome would be, then they probably could have been given a looser leash in organizing themselves and the task. Students could not help but to comment upon the fact that even though communities ought to be self-organizing and free to pursue their own common interest, they were greatly helped, due to the nature of task, with a clear goal, by us driving the stake in the ground. In this task setting, there obviously was a clear need for active stakeholders.

- “Peerness”, relates to collaboration in an open source spirit, a win-win situation, where people willingly and actively share and help each other to come to better and richer understandings without any second thoughts or hidden agendas. Such a level of peerness would indeed further a joint knowledge sharing and learning climate that would be truly a mark of a well functioning community. Did such a level of peerness emerge in our study? Alas, as it turned out students did not work in such a manner together. Instead, three forms or modes of collaboration seemed to emerge. First, most students seemed to work in “isolation”, within their own micro-cosmos, once they had established roles and responsibilities in the non-wikiness mode. Here, some students even reported that if someone made a change to their contributions this could lead to a sense of violation of their integrity and resulted in immediate corrective actions, i.e. undoing the changes. When asked about this, most seemed to agree that their main goal had been to complete the task as quickly as possible, without too
much fuss, and only going off-wiki for coordination. Second, there were, of course, occasions where students helped and complemented each other, in a co-writing manner, editing and suggesting changes, improvements, and new angles to each other’s text. In those instances, their joint contributions became remarkable well worked through, and they expressed that their understanding of both the nature and content of the task had become richer. However, upon closer inspection, i.e. when the students were questioned, it turned out students already knew, or had come to know, each other very well. They had established a level of trust, between each other, a sense of safety, ensuring that they would not make it difficult for each other, respecting each other’s different views and seeing them as complementary to their own. Last, there were some occasions where students working on the same chapter seemed to be doing so in a manner as mentioned above. However, as it turned out, this was usually due to one or two informal leader having emerged and established their position in the non-wiki mode. Such students usually felt greater responsibility towards a task well done. It seemed that the group’s performance reflected upon their own, and thus they invested a lot of energy in maintaining control of the task, pushing the others and critically reviewing what each and everyone contributed with to the wiki.

4. Implications for wikis in supporting organizational learning

The problems and issues that we have identified in the previous section provide us with a starting point connecting the wiki to organizational learning. In this section, we will take back these ideas discussed in sections 3 and 4 to the learning frameworks presented above in section 2.

4.1 Organizational learning level and perspective

We start with a general look at the potential impact of wikis on organizational learning using the “organizational learning level and perspective” matrix, see table 2.

<table>
<thead>
<tr>
<th>Perspective Level</th>
<th>Cognitive</th>
<th>Social</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Wiki provides easy support for documenting facts and for access to relevant and accurate information for fact based problems.</td>
<td>Seems to be hard to get a close and personal contact with others, tendencies to create personal micro cosmos are seen.</td>
<td>This depends on the mode that the wiki is used, anonymously or not. If so, the wiki can be used as a platform for free and unbiased knowledge development.</td>
</tr>
<tr>
<td>Group</td>
<td>Wiki supports collaborative writing and a repository for codified knowledge of a group of people. However, for non-participants of this group to come in and understand this material might not be so easy.</td>
<td>Wiki can be used as a supporting infrastructure for creating communities, but it does not have a high level of interaction needed for effective group building.</td>
<td>Knowledge champions are important drivers for a working knowledge community and the wiki provides an arena for rallying interest and support an issue or problem and building collective knowledge around it. Therefore, individuals can use the wiki for creating a power base. Here we see the contradictions between anonymous or non-anonymous modes.</td>
</tr>
<tr>
<td>Organization</td>
<td>Wiki can provide an organizational memory function, realizing hopes of better decision making, problem solving.</td>
<td>Here we are looking at an organization cultural aspect and to what extent wikis can be used for building of an</td>
<td>Here the cultural and organizational power problems come together. A wiki can be an agent of systemic change and</td>
</tr>
</tbody>
</table>
introduction of new employees, etc. However processes for ensuring the validity of facts in the wiki, or rather the lack systematic support in the technology of wikis might be a problem.

organizational culture. The culture of wikis is described as an open learning friendly one, which could be very positive from an OL perspective. The possibility of using a wiki to achieve this has not been investigated.

promote an organizational learning culture, or become a stabilizing / conserving force. No real investigation on this perspective.

4.2 Organizational learning

The learning cycle proposed by Kolb describes a process where experiences are translated into concepts, which in turn are used as support in future experiences, all this on an individual level. The points to the wiki as just a part of such cycle, and that there always is a need of organizing (or just giving room for) the experience making. The wiki then can support the conceptualizations and reflections following those experiences. From a group perspective (the action learning perspective, as discussed by Revans), there is a focus on learning with others in a work group in a natural context. If we look at the wiki culture (Moskaliuk and Kimmerle, 2009) this seems to be the natural use of a wiki. Here we can see the importance of trust in the work group as an engine for knowledge creation and collaborative learning. We can also see how this connects to the cultural side of working with a wiki. The pre-existence of problems and goals (inherent in a work situation), provides a basic structure for the wiki use. The technical artifact of a wiki does not necessarily provide this context for the use, it is merely assumed in a tradition of wiki culture.

Moving on to the more organizational wide questions, we can see more aspect that needs to investigate, whether a wiki might support structures and processes for organizational learning. The single/double loop learning theory of Argyris and Schön points to a challenge for wiki use. The single loop learning with the “doing things right” approach seems to fit well with a wiki. Here people involved in a work practice can contribute with experiences. However, in double loop learning process this might not be as easy. Here we need to support a critical discussion about the standards of how to measure what is good. From “the fifth discipline” perspective, the need of understanding the possibilities of a wiki is important, with the focus on systemic thinking and integration. The wiki as technical artifact is certainly possible to use in the building a “learning organization” of the Senge vision. Senge write (190, p. 2) about “new and expansive patterns of thinking” and about “collective aspiration ... set free”. This connects to views on the culture of wikis discussed above, and stresses the need between this vision of use of wikis and the vision of organizational learning. Both are need in order for the rather open technical solution of a wiki to deliver any good support for an organization.

4.3 Social learning

Taking the perspective of Wenger (1998) on social learning means focusing on communities of practice within organizations, and questioning what role the wiki concept may play, and how, in supporting or enabling the “on goings” of such dynamic constellations. Communities of practice are a widely recognized source of organizational knowledge generation and learning (Wenger, McDermott, & Snyder 2002), and thus have gained much attention in terms of supporting them through organizational and technical means. The wiki concept is here interesting, as it seems to be able to support many of the characteristics of communities of practice, such as mutual engagement, joint enterprise and a shared repertoire. If we are to take the wiki concept seriously it becomes important to examine how it addresses the dimensions of a learning architecture in this regard, as Wenger (1998) pointed out, any means for supporting social learning within communities should address these to some
degree. In Table 3, we examine these dimensions in relation to the four central themes from our empirical study.

Table 3: Dimensions of social learning and wiki support

<table>
<thead>
<tr>
<th>Themes</th>
<th>Surfing the wave</th>
<th>Non-wikiness</th>
<th>The hidden hand</th>
<th>Peerness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation/revision</td>
<td>Students found the wiki supporting their participation in the task (although it was not designed to be open). However, the wiki did not explicitly support any form of synchronized behavior as was seen emerging, where they experienced the energy of riding the surf together. In addition, the wiki had no way of catching or dealing with those that failed to participate in the collaborative work, at the same or a different level.</td>
<td>Students found the need to go off-wiki in order to negotiate roles and responsibilities as well as to get to know each other and establish some level of trust. They asked where the social is in the wiki. They also needed to off-wiki to establish common “rules of engagement”. The task period was perhaps too short in this study have this established through sustained mutual engagement.</td>
<td>To complete the task in a timely and orderly manner, participation had to be designed; students were divided in groups and given instructions that somehow regulated what they could achieve.</td>
<td>Students did not cooperate in a manner that spoke of open and equal participation, such that furthers peerness. Most seemed resolved or content to do their part off the work and rarely interfered with each other’s accomplishments. Where this did occur, it was often because students shared common interests, which went beyond the task and the wiki, in the content they were working on. However, these interests had been established long before the task.</td>
</tr>
<tr>
<td>Designed/emergent</td>
<td>Synchronized behavior/mutual engagement was something that emerged, not designed.</td>
<td>Wiki is not designed (or support) explicitly for offline activities. The need to go off line and socialize might be an indication that there are things that cannot be designed (embedded into the wiki).</td>
<td>In the task given to the students a meta-structure had been designed for them to follow, with accompanying instructions. This was necessary for the task to be successfully completed. This was an important insight. For a wiki to be useful for collaborative work careful design is required to balance what may emerge.</td>
<td>We had not designed the task specifically for students to be “peering” each other. We hoped this would arise by itself. However, in those instance it did arise was either based on trust or self-appointed responsibilities.</td>
</tr>
<tr>
<td>Local/global</td>
<td>In the task given to the students, they were asked to reflect how their own “chapter” was related to the chapters other groups worked on. This was achieved partly by designed multi-membership, i.e. students were at the same time participants in other “chapter groups”, thus creating inter-</td>
<td>No evidence was found that what students did in the off-wiki mode outside the wiki had any bearing upon the content of the wiki. Nor was any evidence gathered that what they did in the wiki had any effects outside the wiki.</td>
<td>No restrictions or encouragement was given in this regard.</td>
<td>No restrictions or encouragement was given in this regard.</td>
</tr>
</tbody>
</table>
upon either both the open nature and forms of participation, or that an organization using wikis as tools for collaboration makes a conscious effort in this direction.

<table>
<thead>
<tr>
<th>Identification/negotiability</th>
<th>The synchronized behavior of students could be interpreted as both a successful identification with the task and the group as well as successful negotiating (although in off-wiki mode). On the other hand, those that failed to participate could thus be an indication of that the opposite was true. The wiki does not guarantee successful mutual engagement, through identifying with the task and negotiating its meaning, only permits it.</th>
<th>The need for going off-wiki in order to build trust, and define each other’s roles and responsibilities, and meaning of the task suggest that negotiability may not be adequately supported by a wiki.</th>
<th>In those instances where peerness occurred, it was mostly due to students taking a responsibility of the “whole”, and scrutinized what the others had contributed with to the wiki. Our study period was too short to indicate emergence of peerness caused by long-term trustful mutual engagement.</th>
</tr>
</thead>
</table>

From the examination, shown in table 3, we have summarized implications for the use of wikis in supporting communities of practice.

1. Wikis may support mutual engagement; however care needs to be taken to allow for different types of participation and non-participation, i.e. allowing for off-wiki activities as well as catching those that for different reasons fail to participate, as was seen in the themes “Non-wikiness” and “Surfing the wave”.

2. Wikis may support joint enterprise in allowing individuals to come together and work for a common goal. However, care needs to be taken that the goal they work towards achieving is clearly visible to and understood by all, least the collaborative work takes directions that are not in line with the task at hand, as was noted in the theme “The hidden hand”.

3. Wikis may support the emergence of a shared repertoire, through participants’ sustained engagement over time, thus allowing for the creation of a history of common experiences serving as a foundation for future negotiability and sense making. A shared repertoire is a requisite for peer review and production. However, this is not something that may be designed into the wiki, may never be enforced. This quality of a wiki depends upon the members themselves and their interactions in working together, which was noted in the themes “Non-wikiness” and “Peerness”.

4. Wikis may serve an existing community of practice as one tool for collaborative work, but not foster it, i.e. not guarantee its existence or emergence. Nothing from our
study suggested that, as the students were thrown together to accomplish a specified task, some sort of community arose. Rather, such a constellation takes far longer time to build and foster than what our study permitted. What we achieved would be best described as project groups as the members did not elect themselves, were given a specified task, and then scattered as the “job” was accomplished.

5. Concluding discussion

The investigations of wikis in organizational learning context reveal a number of possibilities and issues. In summary, we would like to point to some issues that need more investigations. Two main aspects are in focus, organizational and social. Both analyses above, point towards the need of planning and organizing around the wiki in order to serve as a good support for organizational learning.

From a more technical/data point of view, a common trait of wikis is a technology to use. The threshold of technology use must be low, making it easy for people to do things together. Still, it is not given that everyone finds this so.

- On an organizational level, we can see a dimension of control and autonomy dimension of organizational learning and that the use of wikis can be used for different purposes along this line.
- Level of co-ordination of collaboration process. Questions about if there should be an explicit control mechanism be used or should the invisible hand of social interactions guide the development of a wiki-based knowledge community.
- Working with wikis in an anonymous or non-anonymous mode. The basic idea of wikis seems to be to operate in an anonymous mode, and on a basic level, this might clash with need of controlling and directing learning as an organizational process.
- Structure of learning processes. In order to prevent the wiki to become mainly a data repository there is clear need of organization for learning. Questions like experience vs. conceptualization processes must be handled. The experiential learning cycle includes both knowledge creation and knowledge distribution/use. The wiki must be set up depending on the needs of the process.
- Quality and validity of the material, which is entered into the wiki. Are there any oversight technical possibilities that can be used by someone responsible for quality?

From a social level, we can see number of issues that needs to be handled for wikis to be supportive of organizational learning processes.

- The timing or synchronizing of the interaction. How to set up the wiki and the process around it, in order to facilitate the “surf wave” of messages that is needed to for the wiki-process to work, and to balance off-wiki with on-wiki activities.
- Group building, the social dimension of the people interacting. How to create peerness arising from trust, and ensuring mutual engagement based on identification/negotiability (Wenger, 1998).
- Non-participation issues, such as free-rider problems, but also allowing for different types of levels of participation, from peripheral to core (Lave & Wenger, 1991). Need to recognize that not everyone may be able to participate at the same level at the same time, and catching those that fall through.
- Connecting the local with the global. Knowledge generated in collaborative work within a wiki does not necessarily leverage itself outside the wiki. Need to ensure that the knowledge could be meaningful outside its local context. Need to ensure that new energy is fed into the group work, and that the work performed is meaningful within a larger context.

A wiki seems to be a place where people can come together and very freely discuss, argue, and develop new knowledge. In the worst case, the wiki becomes an oddly shaped data repository. However, much of the problems seem to stem from the fact that a wiki is both a
technical artifact with a set of possibilities and the same time a cultural phenomenon with a set of assumptions about how people should behave when using it. Our main finding is the importance of the dynamic flow between people. We call it surfing the wave of a wiki supported knowledge creation process. At the same time, when confronting this with the organizational learning area, and its need of structure and order, there is a clash. Therefore, the challenge seems to be to preserve the dynamics of a wiki process with these organizational needs. Another way of approaching this might be to choose to see wiki as support for existing dynamic groups, which are trusted with coping on their own. This ultimately goes down to the organizational strategy for knowledge management (compare with, Hansen et al., 1999). Future studies of wikis for organizational learning should focus on these two aspects: the social/cultural vs. technical dimension and the control vs. autonomy dimensions of wikis.

References


